

REMARKS

Reconsideration of the present application as amended is respectfully requested. Claims 1-27 are pending. Claims 8, 19, 21 are cancelled. Claims 1, 7, 11-14, and 18 have been amended. Claims 24-30 are new.

Claim Rejections - 35 U.S.C. § 102

The Examiner has rejected claims 1-23 under 35 U.S.C. 102(e) as being anticipated by Cheong et al. (US Patent 2003/0143791).

Independent claim 1, as amended, claims an invention wherein one or more trenches are filled with a semiconductor material (306a, Applicant's Fig. 3C) "*contacting the semiconductor substrate*" (301, Applicant's Fig. 3C). It is Applicant's position that Cheong fails to anticipate claim 1 because Cheong merely discloses a method wherein a semiconductor material is deposited *on a gate insulation layer* (365, Cheong Fig 3J). Cheong further states, "[r]eferring to Fig. 3H, a gate insulation layer 365 is formed on the exposed substrate 300." (Cheong, Paragraph [0039]). Then Cheong states, "Referring to Fig. 3I, a gate conductive layer 370 is formed." (Cheong Paragraph [0039]). Thus, while Applicant's semiconductor body is in contact with the *substrate* 301, the Cheong semiconductor layer 370 is in contact with a *dielectric insulator*.

Noting that claims 2-10 depend upon claim 1, Applicant understands dependent claims 2-10 to be allowable on at least the same basis as independent claim 1. Applicant has amended claim 7 to retain proper dependency.

Independent claim 11, as amended, requires a gate electrode and a gate dielectric on the sidewalls of the semiconductor material. In contrast, the Cheong reference does not have a gate dielectric or gate electrode on the sidewalls of the semiconductor material. Thus, it is Applicant's position that Cheong fails to anticipate claim 11. Claims 12 and 13, dependent upon claim 11, should also be allowable for at least the same reason as claim 11.

Independent claim 14, as amended, also claims a method a semiconductor body “*contacting said semiconductor substrate*” is formed. Therefore, it is Applicant’s position that for the same reasons provided for independent claim 1, Cheong fails to anticipate Applicant’s claim 14. Claim 14 has also been amended to reflect that Applicant’s invention does not require removing excess semiconductor material or selectively etching both the oxide and nitride layers to form the semiconductor bodies. As Applicant originally disclosed, “a portion of the trench layer may be retained to effect benefits...shown in Figures 3F and 3G, a portion of the first oxide layer is retained to reduce fringe capacitance.” (Applicant’s Paragraph [0029]).

Because claims 15-23 depend upon claim 14, Applicant understands dependent claims 15-23 to be allowable on at least the same basis as independent claim 14. Claim 18 has been amended to retain proper dependency upon amended claim 14.

On this basis, Applicant respectfully requests Examiner to remove the 35 U.S.C. §102 rejection from claims 1-23. Applicant respectfully submits that in view of the amendments and supporting arguments set forth herein, the present application is in condition for allowance.

New Claims

Claim 24

Applicant has added new independent claim 24 and new dependent claims 25-28 to more particularly claim Applicant’s invention. Noting that claim 24 requires an “*epitaxial semiconductor film*,” Applicant understands claim 24 and dependent claims 25-27 to be allowable in view of Cheong. Webster’s dictionary defines “epitaxial” to be “the growth on a crystalline substrate of a crystalline substance that mimics the orientation of the substrate.” This definition is supported by trade usage where an epitaxial film is considered to be a predominantly monocrystalline film grown upon a monocrystalline seed region. Therefore, the

Cheong semiconductor material is not epitaxial because it is deposited *on a gate insulation layer* (365, Cheong Fig 3J), not a monocrystalline seed layer. The limitation of “epitaxial” in claims 24-27 is supported by the original disclosure in paragraph 0019 of Applicant’s specification, teaching an embodiment where the “trenches are filled with epitaxial silicon.” Claim 24 describes one an inventive aspect where the trench layer is comprised of at least two films of differing composition, the first film is formed over the substrate semiconductor, but not necessarily directly on the substrate semiconductor, to act as an etch stop relative to the second film formed directly on the first film. This claim describes an embodiment as depicted in Applicant’s Figures 3A-3F where 303 is the first film and 304 is the second film of claim 24. Dependent claims 25-27 more particularly describe the method of forming a transistor on the exposed semiconductor fin such as the embodiment depicted in Fig. 3G and described in Applicant’s Paragraph 0028 as a “tri-gate transistor” embodiment.

Claim 29

Applicant has also added new independent claim 29 and dependent claim 30 to more particularly claim the Applicant’s inventive subject matter. Claim 29 specifies the variation in the transistor sidewall height (H_{Si}) is less than the variation in the heights of the epitaxial semiconductor bodies. The subject matter of claim 29 finds support in the original disclosure in Applicant’s Figs 3A-3G. Applicant teaches an embodiment with a “trench layer comprised of a first oxide, 302, a nitride, 303, and a second oxide, 304” and “eventually the tri-gate body thickness, H_{Si} , will be determined by the thickness of the second oxide layer, which is a very controllable thickness.” (Applicant’s Paragraph 0022) In certain embodiments, where more films than just the second oxide layer are etched to form the trench subsequently filled with a semiconductor film (Applicant’s Paragraph 0024), the variation in the total trench depth would be less controllable than the variation in the thickness of the second oxide layer.

As taught by Applicant, various selective etches can be utilized to remove only a portion of this composite trench layer, using the various trench layers as etch stops to more controllably expose the semiconductor fin and thereby produce a more uniform H_{Si} . Claim 29 is Applicant's attempt at more particularly claiming the structurally unique features of transistors formed by certain embodiments of Applicant's method. Similarly, Applicant's dependent claim 30 describes the a particular transistor embodiments incorporating the features of claim 29, such as the one originally depicted in Applicant's Figure 3G.